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FISHING AND OTHER RECREATION BEHAVIOR AT HIGH-MOUNTAIN LAKES IN WASHINGTON STATE

by

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ABSTRACT

Results of a 2-year participant observation study of recreational activities at seven high-mountain lakes in unroaded areas of Washington State are reported. The data indicate that access-related factors such as distance--elevation to gain--and the presence and type of trail seemed to account for the amount and kind of use occurring at the lakes.

Anglers fished an average of less than 2 hours per day, and 40 percent caught no fish. A variety of reasons were given for visiting the lakes--fishing was only one; and 80 percent of the fishermen cited some other primary motive for visiting the lakes studied. More than half the anglers gave reasons other than catching fish or providing food as their main reason for fishing.

These data suggest (1) the need for sociological as well as biological data as the basis for high lake management, (2) limitations on the potential of managing visitation at such lakes by manipulating the fishery, (3) the importance of lake shore, campsites, and trails as the focal point of use, and (4) the need for management to preserve fishing as an important part of the high-lake recreation experience for many visitors.

KEYWORDS: Recreation, recreationists, fishing, management (forest), land management, Washington.

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INTRODUCTION

The rapid increase of recreation use (and its associated impacts) at high-mountain lakes in unroaded areas is of growing concern to resource managers. In the Pacific Northwest, for example, records show visits to classified Wilderness increased over 70 percent between 1966 and 1973.[1] The growing use of roadless areas often has been accompanied by increasing demands for their designation as wilderness or some other permanent, roadless state where people can pursue a variety of recreational activities such as hiking, fishing, and hunting.

High-lake fisheries are thought to play an important role in backcountry and wilderness because most recreation takes place around lakes and streams. Users show strong preference for lakes over streams (Brown and Schomaker 1974).

Concern about increasing high-lake use led to our involvement in an interdisciplinary case study of seven high-mountain lakes in the Alpine Lakes region of Washington State's Snoqualmie and Wenatchee National Forests. Great controversy then surrounded the future status of this area, a large part of which has since been designated as Wilderness (Alpine Lakes Management Act of 1976, PL 94-357). The area is blessed with hundreds of high lakes which attract growing numbers of recreationists. At many lakes, physical site impacts from recreation use had become a concern, and managers proposed manipulating the fishery to modify visitation (fig. 1). Managers and a prominent citizens group, the Alpine Lakes Preservation Society (ALPS), called for research to determine the role of fishing in recreation use of the area's high lakes so that effective management could be planned.

PREVIOUS RESEARCH ON FISHING

There have been relatively few studies focused on the human behavior aspects of fishing, particularly in roadless (backcountry or wilderness) environments. A recent unpublished bibliography lists just over 100 studies of sport anglers.[2] Some of these studies have looked at who fishes and why--but most of the literature and research on sport fishing has focused on quantity and quality of the catch as a criterion of a successful trip, and recreational fishery management (Webb 1968; Taft 1947; Bryan 1976, 1977). The dominant perspective emphasizes fishing success--while ignoring other satisfactions and pleasures related to fishing.

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[1] USDA Forest Service, Region 6, Wilderness Use Statistics. Portland, Oregon.

[2] "Studies of sport anglers: an annotated bibliography," by Thomas E. Dailey. Unpublished data available from Recreation Research Unit 4507 University Way, Seattle, Washington 98101.

Figure 1.--High lake fisheries are thought to play an important role in backcountry areas. Physical impacts from recreation use is of concern to resource managers.

Since the mid-1960's, some managers and several studies have identified broader aspects of the fishing experience which sportsmen deem important. A recent emphasis has been placed on "boat days" (or fishing days) as the product of sport-fishing management (Bryan 1974). And, in spite of the wide diversity of research methods employed in past research and types of fishermen studied, there is surprising consistency in the results so far.

In none of the studies reviewed was catching fish cited as the single most important satisfaction derived from fishing. Escape from everyday tension and pressures, appreciation of natural beauty, companionship, and challenge are frequently mentioned as important components of the fishing experience (Davis 1967; Knopf et al. 1973; Hoagland 1973; Bryan 1974; Bryan 1976; Moeller and Engelken 1972; Bassett et al. 1972; Cooper 1973; Doll and Phillips 1972; Andrews et al. 1972; Spaulding 1970; Hampton and Lackey 1975). It seems apparent that the nature of the fishing experience goes far beyond the actual taking of fish--just as hunting has been found to encompass much more than simply bagging game (Potter et al. 1973; Hendee and Schoenfeld 1973).

The few studies of fishermen in backcountry or wilderness settings indicate similar findings. For example, fishermen in Utah's High Unitas Primitive Area reported fishing as the third most common reason for visiting there (Hoagland 1974), and those studied were similar to other visitors in their concern for the wilderness environment. Lucas (1965) found that a majority of parties fished on visits to the Boundary Waters Canoe Area and that although the findings varied according to type of user (canoeist, day user, auto camper, etc.), a minority of respondents mentioned fishing as their most important activity in the area. Baseline studies of wilderness visitation to several wilderness and backcountry areas indicate that only about half the visitors fish (Hendee et al., in press).

It appears that in all settings studied, fishing is only one of many activities associated with a total outdoor experience in which escape from civilization, enjoyment of the natural environment, and other factors are of major importance. This is summed up by Davis (1967, p. 44) who says of both sport hunting and fishing, "The sport was rarely appealing in only one manner. Although a trip may have been triggered by a single interest, usually a package of changing and interrelated benefits appealed to the participant" (fig. 2).

Despite the fact that studies of fishing consistently identify the interrelationships of fishing motives to a broader outdoor experience, few, if any, have focused directly on how fishing is interwoven and related to other activities. Nor do any past studies directly observe the behavior of fishermen, describing exactly what they do. Most studies of the sociology of fishing have been concerned with reported preferences, attitudes, behavior, and motivations--factors which may have less to do with real behavior than one might think (Wicker 1969, Deutscher 1970, Heberlein 1973, Spaulding 1970).

Figure 2.--Fishing is only one of many activities associated with a total outdoor experience at wilderness and back-country mountain lakes.

STUDY FOCUS

The study reported in this paper is concerned with the sociology of high-lake fishing. A companion study focused on physical-biological aspects.[3] Information needed for high-lake management requires a marriage of biological and sociological research. Information is needed on what people do at high lakes and the satisfactions they derive from the recreational experiences--including fishing. That social data must then be related to the resources' capacity to produce desirable experiences.

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[3] The physical and biological data were collected under the supervision of Dr. Richard Whitney, Leader, Cooperative Research Unit, Bureau of Sport Fisheries and Wildlife, College of Fisheries, University of Washington. The findings of this phase of the high-lake study are reported in Bengston, Clifford (1973), "Some Physical and Biological Features of Eight Highland Lakes in the Wenatchee and Snoqualmie National Forests." Unpublished report on file, College of Fisheries, Univ. of Washington, 84 p.

Our study of recreation behavior at high lakes focused on several research questions:

1. Who visits the lakes?
2. How much do they fish and how much do they catch?
3. What is the role, importance, and meaning of fishing in relation to other high-lake activities?
4. What factors seem to affect the nature and extent of fishing at the lakes?
5. How important are fishing and catching fish in prompting recreational use of the lakes?

METHODOLOGY

The research strategy we employed was participant observation (Gold 1958, Campbell 1970). This approach seemed appropriate because of the open-ended exploratory nature of the questions we were studying and the general lack of information on what behaviors constitute a visit to high-mountain lakes (Clark 1977). Participant observation affords an array of specific approaches for describing behavior and determining its meaning through the researcher's direct interaction with participants.

Data for this study were collected over two summers--1973 and 1974. The basic role assumed during the 1st year of data collection was that of *complete participant* (Campbell 1970). That is, the research staff engaged in activities similar to other visitors to the area. This approach allowed observation of recreation activities without affecting the behavior observed. As a participant, the researcher also gains some feeling for the meaning of the activities observed. That is, the researcher gains insight into the qualitative aspects of the experience which could not be obtained by an outsider who only observes and does not participate in the activity under study.

During the first summer, we maximized opportunities for observing high-lake visitors. We focused primarily on weekends and at those lakes where use was most likely to occur. Ten to 14 days were spent at each lake (a total of 50 days for all lakes) by one or two trained observers. We were not concerned at this time with the representativeness of the lakes, the users, or their behavior. Rather, we sought to discover possible relationships which would require more systematic procedures to verify.

The activities of each lake visitor were recorded, particularly fishing behavior. Detailed notes were made of all anglers' activities, and nonfishing behavior was observed at least every half hour. The location of the behavior relative to campsites and lakeshores and a general description of the type of activity was recorded.

Based on results of the first summer's work, procedures were modified the 2d year to gather more data on fishing activities such as time spent, motives, the respective importance of fishing compared to other behavior, and so forth. We concentrated on one lake this year although several of the other lakes were occasionally visited to get comparative data. During this second summer, the researcher assumed a role of *participant-as-observer*. This differs from the complete participant role in that the participant-as-observer assumes a formal role as necessary to gather more complete information about feelings, motives, satisfactions, and so forth through unstructured conversational contacts with users.

These two approaches allowed us to gather extensive observational data the first summer on what visitors to high-mountain lakes do, followed by conversational data the second summer about motives for participating in different activities and the meaning of these activities to participants.

LAKES STUDIED

The seven lakes selected for study offer a variety of recreation experiences and are, in many respects, characteristic of the Alpine Lakes Region. Most of them are included in the new Alpine Lakes Wilderness where managers have already pointed to growing problems of visitor impacts. The lakes selected vary in ease of access, reputation for fishing success, location relative to other lakes, and the amount and type of use. Trailheads to all of the lakes were located within 2 or 3 hours driving time from the heavily populated area around Puget Sound in western Washington (fig. 3).

Figure 3.--Trailheads to the lakes were within 2 to 3 hours driving time of the heavily populated Puget Sound area.

Tables 1 and 2 describe the lakes' physical and biological characteristics, as well as access data and the extent of our observations. Four distinct high-lake settings were selected, three of

Table 1--*Physical and biological data on high lakes studied*[1]

Study setting number	Name of lake	Elevation	Size of lake	Maximum depth	Summer water temperature		Water clarity	Fish age class	Total fish length	When last stocked[2]	Fish species
					Maximum	Minimum					
		Feet	Acres	Feet	°F.	°F.	Feet	Years	Inches		
1	Lake Stuart	5,064	40	58	63	46	37	1-4	4.4-10.9	1972	Cutthroat
2	Lake Flora	5,680	8	46	62	53	34	2-5	7.6-11.6	1966	Cutthroat
	Lake Brigham	5,840	4	10	59	59	--	[3]	[3]	1971	[3]
3	Top Lake	4,600	6	10	65	65	--	[3]	[3]	1961	[3]
	Pear Lake	4,809	15	83	64	42	40.5	2-4	6.5-11.1	1968	Rainbow
	Peach Lake	4,907	8	73	57	47	46	2-6	7.8-10.7	1972	Cutthroat Rainbow
4	Lake Julius	5,190	12.8	61	59	46	33	1-4	5.2-10.4	1967	Cutthroat
	Lake Eileen	5,508	25	73	56	47	40.5	1-4	4.4-9.8	1971	Cutthroat

[1] Source of this data is in Bengston, 1973 (see footnote 3).

[2] State Game Department records of plants may be incomplete for some lakes.

[3] These shallow lakes contained very few fish but attracted some fishing. Nets left overnight by the University of Washington College of Fisheries data collection team failed to capture any fish, but a very few fish were reported caught by fishermen.

Table 2--*Access-related data and extent of observations at high lakes*

Study setting number	Name of lake	Elevation to gain	Shortest access trail distance	Possible means of access			Type of trail	Days observed		Visitors observed[1]	
				Foot	Horse	Trailbike		Year 1	Year 2	Year 1	Year 2
		Feet	Miles								
1	Lake Stuart	1,660	5.7	Yes	After Sept. 8	No	Terminal	14	22	222	449
2	Lake Flora	3,480	11.5	Yes	Yes	Part way	Loop	10	--	39	--
	Lake Brigham	3,640	12.0	Yes	Yes	Part way					
3	Top Lake	1,050	4.7	Yes	Yes	Part way					
	Pear Lake	1,339	5.6	Yes	Yes	Part way	Loop	12	--	73	--
	Peach Lake	1,740	6.0	Yes	Part way[2]	Part way	No trail last 1/2 mi.				
4	Lake Julius	2,230	6.0	Yes	Yes	Yes	Loop	14	7	110	36
	Lake Eileen	2,530	6.5	Yes	Part way[2]	Part way					
Totals								50	29	444	485

[1] Total visitors observed during both summers are indicated, including those who were not observed during their entire stay.

[2] The first year of the study (1973), trailbike access was possible part way into Top, Pear, Peach, and Eileen Lakes, and all the way to Lake Julius. The trail to Lake Julius was closed to trailbikes in 1974 by the Wenatchee National Forest.

them including two or more lakes. Lake Stuart, the largest lake, was the only one not located relatively close to at least one other lake.

All of the lakes are between 4,600 and 5,800 feet above sea level in the Hudsonian life zone. They ranged from 4 to 40 acres in size. All were clear and cold containing cutthroat or rainbow trout. The capture of fish with a gill net in each lake indicated the fish ranged from 1 to 6 years old and from 111 to 282 millimeters (4.4 to 11.6 inches). Almost all of the fish appeared to be the result of stocking by the Washington State Game Department.

LIMITATIONS OF THE DATA

The extent to which results can be generalized from the study design warrants comment before discussion of results. Certainly, the study design precludes definitive statements about the representativeness of users or their behavior over time or space. The participant observation study design maximizes discovery of relationships and the meaning of an activity to participants through direct interaction of the observer. Such results can be revealing, particularly when they question existing conjecture and folklore about an activity that may be based largely on informal impressions.

The following study results, based on observational and conversational data, reveal the complex relationships between fishing and other behavior at the high lakes studied. We are eager to use the insights gained from this study to help point the way to more definitive study using other research methods, and more knowledgeable management in the future.

RESULTS AND DISCUSSION

Profile of Users

Through observations and conversations with visitors to the lakes, we collected descriptive information about their individual and group characteristics and their previous backcountry and fishing experiences. The data for the first summer are summarized here in the text.

Observations of all users during the first summer (N = 444) revealed the following:

1. Three-fourths of the visitors we saw were male.
2. Half appeared to be adults between 20 and 40 years old. Another third were young people, 12-19 years old.
3. Most people came with others. Most of the groups were small, family or friendship groups. About one-third were groups of male peers, one-fourth were families, and one-fourth were mixed couples. Only about 10 percent of the

parties were single persons or organization groups. Nearly 40 percent of the individuals observed during the summer belong to 11 organized groups that visited the lakes during observation periods.

Conversation contacts with roughly half of the people observed indicated that:[4]

1. Eighty percent were from urban rather than rural areas.
2. Most were from the more urbanized western Washington (70 percent), about one-fifth from eastern Washington, and only 8 percent were from outside the State.
3. Most of the visitors we contacted had previous backcountry experience, and only about one-fourth had less than 2 years experience. About 40 percent of the visitors had been to the same lake before. Another fourth had been to the general area in the past. (Anglers appeared to have more backcountry experience than nonanglers.)
4. Nearly half the visitors had not fished in the backcountry before, and only about one-fourth had more than 5 years of experience as backcountry fishermen.

This profile of users has important research and management implications. The most striking fact is that most backcountry users visit the lakes in groups. The importance of the group as a reference point will be discussed later in greater detail.

Extent of Activity

FACTORS AFFECTING USE

Several factors seem to be related to the nature and extent of use. Our data and observations suggest the following relationships.

Ease of access, reflected by the distance and elevation to be conquered, seemed directly related to the amount of use.[5] Lake Stuart and Lake Julius, the easiest to reach (including necessary travel on backcountry roads), attracted the heaviest use--both overnight and day use.

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[4] Conversational contacts were made primarily with those people we observed fishing. About 20 percent of these contacts were with nonfishermen.

[5] An unpublished study suggests that important correlates of use include whether or not sites are established at lakes, elevation at which sites are located, and trailhead accessibility. Stuart, Thomas W. 1973. Explanatory Models of Wilderness Use: Glacier National Park, 1973. Unpublished manuscript, 11 p., mimeo. Available from School of Forestry and Conservation, Univ. of California, Berkeley.

Lakes that did not have formal trails for access (Peach Lake and Lake Brigham) received much less use despite the fact that they were less than a mile from other lakes on the trail.

Whether or not the lake was on a terminal or loop trail also affected use. Loop trails were associated with stopovers by users on longer trips and some use by persons traveling from a base camp located at other locations. Destination trails were sometimes associated with concentrations of users less able to move on to other lakes to avoid crowding.

Horse use seemed to account for some visitation that might not otherwise have occurred at more distant lakes, particularly Lake Flora and Lake Brigham.

From our observations, it seems apparent that these access factors--distance, elevation to gain, trail or no trail, loop or terminal--are major items for land managers to consider for understanding and influencing patterns of use at high-lake settings (fig. 4).

Figure 4.--Access factors such as distance from trailhead, elevation to gain, and type of trail influence use patterns at high mountain lakes.

Fishing Activity

Fishing often is assumed to be the major activity and primary motive for visiting high mountain lakes. Perhaps this was so before the popularity of backcountry and wilderness recreation increased during the past decade, and perhaps some remote lakes still are visited primarily by fishermen. But, at the seven lakes we studied (table 3), less than half the recreationists we observed (41.6 percent) fished during their stay. And nearly half of the parties we observed (42 percent) contained no fishermen. As previously mentioned, baseline studies of wilderness use reveal similar findings in that about 50 percent of the visitors report that they fished during backcountry trips (Hendee et al., in press).

Table 3--*Proportion of camping parties and individuals observed fishing during their high-lake stay*

Visitors	Camping parties	Individuals[1/]
Total number observed	88	376
Percent observed fishing	58	42

[1/] Only visitors observed during their entire stay were included in this table.

We also recorded the amount of time which anglers spent fishing (table 4). On the average, more than half of the fishermen observed (60 percent) fished 1½ hours a day or less during their stay. The mean time spent fishing per day for all fishermen was 1.8 hours--about half the average fishing day of 3 to 4 hours reported after a comprehensive study of fishing by the Outdoor Recreation Resources Review Commission in 1962 (U.S. Bureau of Sport Fisheries and Wildlife 1962).

Table 4--*Number of fishermen among high-lake users, by average time spent fishing*

Users	Average number of hours fished per day while at site									
	Less than 0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	More than 4.0	Total[1/]
Fishermen	38	32	21	16	15	13	3	4	11	153
Percent	25	21	14	10	10	8	2	3	7	100

[1/] Only visitors observed during their entire stay were included in this table.

The relatively low level of fishing activity challenges the stereotyped image of high-lake fishing trips. One wonders what success these fishermen were having, and how success related to the level of fishing activity.

FISHING SUCCESS

Tables 5 and 6 indicate that people obviously did not stop fishing because they were catching legal limits. In fact, about 40 percent of them caught nothing. Only about 12 percent averaged 4 or more fish per day during their stay, compared to the daily legal catch limit of 12 fish.

Table 5--*Fishing success per day by individual high-lake visitors observed fishing*[1]

Fishermen	Average number of fish caught per day							
	0	0+ to 1.0	1.0+ to 2.0	2.0+ to 3.0	3.0+ to 4.0	4.0+ to 5.0	5.0+	Total[1]
Percent	37	29	12	6	7	4	5	100
Number	57	44	19	9	11	6	8	153

[1] Only visitors observed during their entire stay were included in this table.

Table 6--*Fishing success per day by parties containing at least one fisherman*

Parties with at least one fisherman	Average number of fish caught per day by parties							
	0	0+ to 1.0	1.0+ to 2.0	2.0+ to 3.0	3.0+ to 4.0	4.0+ to 5.0	5.0+	Total[1]
Percent	31	12	12	4	10	6	25	100
Number	16	6	6	2	5	3	13	51

[1] Only visitors observed during their entire stay were included in this table.

Success rates were not much better when calculated on a group basis. Over 30 percent of the parties caught no fish and only 25 percent of the parties averaged over five fish a day.

This raises questions about whether the fishermen were catching all they wanted or needed. How important was catching fish to their angling experience? What role did fishing play in their overall high-lake recreation? These questions are addressed later in this paper after some other observations that help explain the appeal of fishing are described.

RELATED SOCIAL BEHAVIOR

The low level of fishing activity and the relatively few fish caught stimulated our curiosity about the relationship of fishing to the overall high-lake recreation experience. To explore this issue, we related fishing to the social nature of the activity. We recorded where people fished in relation to other individuals from their own and other parties and how much the fishermen conversed with companions and others while fishing. This was thought to be potentially important because studies indicate that wilderness and backcountry recreation are characterized by intense socializing within the party and an aversion to contact with persons from other parties (Hendee et al. 1968; Stankey 1973). The same has been found true for hunting (Potter et al. 1973).

DISTANCE FROM OTHER PEOPLE--TERRITORIALITY

The social nature of fishing was characterized by the spatial relationships fishermen established between themselves and members of their own and other parties (table 7). The apparent affinity for companions and aversion to strangers was evident. Eighty percent of the fishermen carried on most of their activity within about 20 feet of a companion, but 75 percent remained 100 feet or more from persons in other parties. Territorial norms appeared to be operating, but the territory seemed to belong to the group and was quite freely shared by members of the same party.

Table 7--*Distance maintained from companions and members of other parties*

Fishermen	Distance from other people while fishing[1]			
	Near	Medium	Far	Total
	- - - - Number fishermen observed - - - -			
Distance from own party				
Percent	82	16	3	100
Number	120	23	4	147
Distance from other parties				
Percent	4	21	75	100
Number	6	33	115	154

[1] Distance fished from others was roughly categorized as follows: Near--within 20 feet of others; medium--within 20-100 feet of others; far--more than 100 feet from others.

Most of those we observed seemed to respect the fishing territory established by another group's prior use. For example, on numerous occasions, two groups were observed fishing several hundred yards apart--one at a more favored fishing spot. Several minutes after the first group left the favored spot, the second group would move there. We observed, however, that the first group had evidently established its right to the spot by prior use, and would often return to the spot even though the second group was there.

The greater the density of people at the lake, the more likely were fishermen to infringe on another group's fishing territory. Under crowded conditions, anglers would move to an area already occupied rather than forego fishing or wait to try at a different time. Below some as-yet-undetermined threshold of crowding, the lake apparently was perceived as a place where at least the illusion of isolation and noninvolvement with strangers could be maintained. Above that threshold, the norm did not appear to operate.

At most of the lakes the campsites' territories did not include the lake shore. This made the shoreline a public place where territory was established by a fishermen's presence, or, occasionally, by his prior use. Camps located next to the lake, however, appeared to establish a more inviolate territory. Regardless of the density of users at a lake, most fishermen confined their activity to the public places along the shoreline or adjacent to their own camp. They seldom fished from shore areas which were a part of another group's camp territory.

CONVERSATION WHILE FISHING

Table 8 indicates the amount of conversation we observed between fishermen and their companions and with strangers from other parties. These data clearly indicate the importance of

Table 8--*Amount of conversation while fishing between fishermen and their companions and members of other parties*

Fishermen	Amount of conversation while fishing[1]			
	Much	Some	None	Total
	- - - Number fishermen observed - - -			
Talking with own party members				
Percent	32	58	10	100
Number	35	63	11	109
Talking with other party members				
Percent	0	9	91	100
Number	0	13	138	151

[1] Amount of conversation was categorized as: Much--steady conversation; some--occasional conversation; none--no conversation.

social contact with companions and aversion to contact with other parties. All but 10 percent of the fishermen engaged in at least some conversation with companions while they were fishing, but more than 90 percent did *not* converse with anyone from another party while they fished.

The content of fishermen's conversations seemed to vary according to whether they were talking with companions or with people from other groups. Most conversation among companions revolved around fishing either as a cooperative or as a competitive activity. Cooperative fishing conversation was most evident in male-female couples. Usually the woman would help the man by holding the fishing pole while he removed a fish, suggesting areas where fish might be, and generally encouraging him. Such cooperation also was often observed in father-son pairs, where the father played an instructive, supportive role.

Both competitive and cooperative conversation was common in male-peer groups where conversations centered on reports of progress in catching fish, good-natured rivalry, and information regarding successful types of bait or lures. Whether cooperative or competitive, fishing frequently appeared to take the form of a game in which the tangible reward or prize was the fish, which served as a symbol that the participant had been successful in applying his skill. Although not everyone was successful, most apparently had fun playing the game while they enjoyed the company of companions.

Even when the opportunity existed, verbal contact between members of different groups occurred less frequently than conversation with fellow group members. Such intergroup contacts characteristically revolved around fishing as a shared experience. For example, remarks between parties were often probing as if to determine the extent to which parties shared motives, interests, or expertise that might serve as the basis for continuing the contact. Such contacts were characteristically of much shorter duration than those between members of the same party.

SUMMARY OF FISHING ACTIVITIES

Our observations of fishing activities are revealing. Less than one-half of the high-lake visitors we observed were fishing during their stay. Those who fished spent only a small portion of their available time at the lake fishing, and they caught few fish. They also spent much of their fishing time interacting with members of their own group. The aversion for social contacts outside their party is demonstrated by the distance maintained between parties and the lack of conversation outside their group.

But, how do anglers spend their nonfishing time? Do they behave differently from the lake visitors who do not fish?

Nonfishing Activity

To put fishing in perspective, we observed the nonfishing behavior of fishermen and other visitors. We noted during daylight hours what people were doing, whether they were away from the lake, at the lake but away from camp, or actually in the camp. These data are presented in table 9.

Table 9--*Time spent during daylight hours at various locations at and away from the lakes*

Location	Number of days at lake							
	Day users		2 days		3+ days		Total	
	Fishermen (N=21)	Non-fishermen (N=68)	Fishermen (N=95)	Non-fishermen (N=110)	Fishermen (N=33)	Non-fishermen (N=26)	Fishermen (N=149)	Non-fishermen (N=204)
	Percent of time							
Observed:								
In camp	0	23	63	69	59	74	58	67
At lake but not fishing	7	44	12	18	8	15	10	19
At lake fishing	68	--	22	--	26	--	25	--
Away from lake	25	33	3	13	7	11	7	14
Total	100	100	100	100	100	100	100	100
Not observed[1]	12	37	17	20	12	18	15	21

[1] Most unobserved time was probably spent either in camp or away from the lake since it was easier to observe users who were at the lakeshore.

Both anglers and nonanglers spent part of their waking time away from the lake (fishermen 7 percent, nonfishermen 11 percent). They explored the area, looked at scenery, walked, and talked--usually within a half-mile of the lake and on or near the trails. They were almost always with companions.

With the exception of day users, fishermen and nonfishermen spent a major portion of their waking time in camp. (Fishermen on the average spent 57 percent, nonfishermen 67 percent.) The importance of the campsite as a hub of activities for all overnight visitors was impressive. Much of the activity in or around the camp area was related to the functional aspects of living outdoors--pitching and breaking camp, cooking and cleaning up after meals, building fires, etc. A large portion of camp time, however, was spent in leisure activities--reading a book, playing cards or a more active game, or just sitting around talking with companions.

Finally, both anglers and nonanglers spent part of their available, waking time at the lakeshore, 35 percent and 19 percent respectively. Nonfishermen, for the most part, spent lakeshore time in a small range of passive-appreciate activities, such as relaxing in the sun while talking to a friend or viewing the scenery. Often they conversed with fishing companions. Frequently, nonfishermen would comment about fish jumping or swimming--and a few people were observed feeding fish.

Fishermen spent their time at the shore in much the same manner as nonfishermen except they spent more than two-thirds of it holding a fishing rod. The only difference observed between these two groups was that much of the anglers' time at the lakeshore was spent fishing. In all other aspects, the behavior of fishermen and nonfishermen appeared similar.

There are interesting variations in the patterns of activity which were apparently related to the number of days a party spent at the site. Day hiker anglers commonly spent several hours fishing and did little else while at the lake. Day anglers typically arrived earlier in the day than those planning a longer stay. They found a good spot and fished for several hours then packed up their catch and went home. Success seemed important to these day anglers. The non-fishing day user spent a large part of his time at the lakeshore (44 percent), more than twice as much as did those who stayed overnight.

Most people spent 2 days at the lake, camping overnight. Those who fished during their 2-day stay are not so easily characterized as day hikers. Those who fished typically did so for a total of 2 to 3 hours, but spread over several occasions during the 2-day period. Contrary to the popular stereotype, few of these people fished early in the morning or late in the evening, a finding supported by other research (Graham 1973, Sohn 1968). Most arose around 8:00 or 9:00 a.m. to fix a leisurely breakfast and maintain camp, and spent the early evening sitting around the campfire. Most of their fishing was done in the mid-afternoon of the 1st and mid-morning of the 2d day. And unlike day-hike fishermen who usually packed out their fish, these overnight fishermen ate their catch on the spot--often for dinner the first day and for late breakfast on the second.

Anglers who spent 3 or more days at the lake predictably spent more time fishing--nearly 7 hours on the average--and spread their fishing time over at least three separate occasions during their stay. Like the 2-day visitors, they were generally casual about fishing and ate most of their fish at the lake.

The nonfishermen who stayed for 2 or more days spent about half as much time at the lake as fishermen. More of their time was spent in camp or in exploring away from the lake.

Clearly, the lakeshore presents the opportunity for a variety of activities in addition to fishing--for fishermen as well as for those who do not fish. The activity of fish in the lake can be a source of satisfaction for nonfishermen as well as for anglers; and, we should mention, fishing sometimes conflicts with other lakeshore activity and visa versa. For example, as lakeshore territories were established by either fishermen or nonfishermen, whether for fishing, swimming, rafting, skipping rocks, or just playing along the shore, their presence precluded activities by others (or set the stage for conflict).

For many, fishing seemed an appealing activity facilitating nature appreciation and social contact with companions. But with the exception of the quest for fish, it appears similar to other high-lake behavior--not very different from sitting on a log gazing at the lake or mountains, throwing rocks into the water, photographing the sunset over a lake, strolling along the shore talking with a friend, or the many other things that we observed people doing during their stay at the lakes.

THE IMPORTANCE OF FISHING AS A HIGH-LAKE ATTRACTION

During both summers, participant observers informally talked with lake visitors to find out why they came to the lake and what anglers liked about fishing. Tables 10 and 11 indicate primary reasons for visiting the lake and for fishing.

One generalization consistently emerging from our informal conversational contacts is that people express a variety of reasons for visiting high lakes (table 10). Fishing was only one reason mentioned, and most fishermen (all but 19 percent) even gave higher priority to other motives. Fishing was second to nature and scenery appreciation as the most frequently mentioned, primary reason for the visit, followed closely by companionship. Escaping daily routine, relaxation, exploration, solitude-comtemplation, hiking, and photography also were mentioned as *primary* motives for some visitors.

When we asked anglers why they fished, several motives were also given (table 11). Twenty-five percent said catching fish and another 19 percent said providing food was their main reason for fishing. But, more than half the fishermen gave other primary reasons such as relaxation, to pass the time, companionship, nature appreciation, etc. (fig. 5).

Table 10-- *Primary reasons given for visiting a high lake*

Primary reason	Fishermen				Nonfishermen			
	1973	1974	Total	Percent	1973	1974	Total	Percent
	- - - -	Number	- - - -		- - - -	Number	- - - -	
Nature/scenery	12	31	43	29	8	25	33	29
Fishing	13	15	28	19	--	--	--	--
Companionship	5	17	22	15	3	14	17	15
Escape	2	11	13	9	5	17	22	19
Relaxation	3	6	9	6	6	6	12	10
Photography	2	1	3	2	2	1	3	3
Exploration	3	5	8	5	--	2	2	2
Solitude/ contemplation	3	3	6	4	--	4	4	4
Hiking	1	4	5	3	1	5	6	5
Peacefulness	--	5	5	3	--	5	5	4
Exercise	--	4	4	3	--	8	8	7
Mountain climbing	--	3	3	2	--	2	2	2
Total	44	105	149	100	25	89	114	100

Table 11--*Primary reasons given for fishing in 1974*

Primary reason	Individuals reporting	
	Number	Percent
To catch fish	25	25
Relaxation	24	24
To pass time	20	20
Provide food	19	19
Companionship	16	16
Nature/scenery	14	14
Skill/challenge	11	11
Contemplation	1	1
Total	101	100

Figure 5.--Although catching fish is the goal for many fishermen, only 25 percent said catching fish was their main reason for fishing.

We can now provide at least tentative answers to the questions raised earlier: How important is catching fish to the fishing experience? Were fishermen catching all the fish they wanted?

Catching fish seemed to be desirable, but not absolutely necessary to an enjoyable fishing experience. The attitudes of many fishermen appeared sympathetic with the opinion of one angler who said, "I like to catch a few fish, but that's a bonus ... fishing is just a nice way to relax and pass the time up here in the mountains."

For some anglers, catching fish *is* the primary reason for fishing. But this did not seem true for most of the fishermen we observed or talked to. The high-mountain lake experience of these anglers probably would not be complete without fishing, but neither would it be complete without other aspects of the experience.

Fishing and the chance of catching fish may have prompted the trip for some people, but when you remove the fish from consideration, the fishing behavior seemed a path to the same kind of companionship and nature appreciation sought by nonfishermen through other activities at the same high lakes. Similar results have been found in research on hunting (Potter et al. 1973).

IMPLICATIONS FOR HIGH-LAKE MANAGEMENT

The foregoing data describe the behavior and motives of visitors to several high-mountain lakes based on two summers of observation and conversational contacts. This research is exploratory; other, research methods are needed to establish the generality of our findings as applied to other lakes or users. But, the implications for management of such areas are many if, indeed, the relationships we observed hold true. Several of the more important implications are discussed below.

Integrating Biological and Social Perspectives: Perhaps the most striking finding is the complex nature of high-lake use. High lakes are a valuable recreational-esthetic asset attracting fishermen and nonfishermen alike. This study and others indicate fishing is an important part of the backcountry experience for about half of the visitors. But both fishing and nonfishing activities yield many other satisfactions, and the focal point for both kinds of users is the lake. Clearly, effective high-lake management will require integration of both biological and social data to develop management programs which provide quality recreation experiences for all high-lake users.

Managing Use With the Fishery: Due to the rapid increase in use and associated impacts on high lakes, managers are giving serious thought to managing the number, size, and species of fish in an effort to modify recreational use patterns. For example, a resolution by the Intermountain Chapter of the American Fisheries Society promotes stocking of high lakes as a means for distributing and controlling recreation use.6/ Our data give some basis for

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6/ American Fishery Society Newsletter, p. 10, Sept.-Oct., 1973. Also see discussion of this issue in Schoenfeld and Hendee 1977.

assessing the probability of attracting, dispersing, or repelling visitors by manipulating the fishery.

Specifically, nearly half the users we observed are unlikely to be affected by changes in the fishery since almost 60 percent do not fish and 40 percent of the parties contained no fishermen. For the nonfishermen, factors other than the fishery must be considered to affect their use patterns.

But what about the fishermen--will modifying the fishery change their use? Our data suggest that for those ardent fishermen who go to the lakes primarily to fish and fish primarily to catch fish--manipulating the fishery would probably change their behavior. If fishery management increased or decreased available numbers and size of fish (and that fact was advertised), ardent fishermen would likely choose among the alternative locations accordingly. And, it is possible that in some situations diverting a portion of the fishermen from an overused lake may go a long way towards resolving an overuse problem. This alternative management approach should not be discarded.

For those "incidental" fishermen who visit high lakes primarily for reasons other than fishing, even though they fish, *or* who fish primarily for reasons other than to catch fish, a change in the fishery is less likely to have an effect. For these fishermen, fishing and catching fish seems incidental to the overall back-country experience. Our observations and conversations indicate these incidental fishermen are in the majority at the lakes we observed.

Consequently, manipulating the fishery to modify visitation at high lakes is, at best, a partial solution. In addition to the chances of catching fish, our observations also suggest that access factors--distance, elevation to be gained, and kind of trail--are correlated with both fishing pressure and visitation by nonfishermen.

In any case, users must be made aware of the available high-lake opportunities and the effort required to get to them so choices can be based on the type of experience desired. The fishery is only one of the variables users seem likely to consider. Managers should consider factors in addition to the fishery for controlling use when necessary.

Importance of the Lakeshore, Campsites, and Trails: At the lakes we studied, the location of the campsites and trails seemed very important--both from a user and management perspective. Fishermen and others spent most of their waking time in camp, and nearly all of it was spent either in their camps or at the lakeshore (fig. 6). The remaining time--less than 20 percent--was spent on trails near the lake.

Given the prime attraction of the lake, it is only logical most people would want to camp and play near the lakeshore. And if the

Figure 6.--The lakeshore is the primary attraction and location for most activities at high mountain lakes for fishermen and nonfishermen.

camps are not near the shore, most are at least in view of the lake, a preference documented in other studies (Brown and Schomaker 1974).[7] This situation presents two potential problems. First, campsites near the shore establish around-the-clock territory for few parties, reducing public space for other users. Particularly penalized may be day users who have no chance to claim territory of their own by establishing an overnight camp.

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[7] See footnote 4 for Stuart (1974).

Second, given the large amount of time people spend in camp, the physical impacts near the shore may be considerable. Because the campsite is the focal point for so much activity, it may also be the focal point for substantial environmental impacts. Consequently, at heavily used lakes, it may be desirable to locate (or relocate) campsites and trails away from the lakeshore to reduce *both* social and environmental impacts. If camps are established away from the shore, much of the impact is diverted from the prime attraction for both fishermen and others. When contemplating such action managers should, however, keep in mind the importance of the lake to all users' experience and seek alternative sites judiciously--preferably with at least a view of the lake.

Preserving the Importance of High-Lake Fishing: This study indicates that fishing and catching fish are only a part of the overall backcountry experience for most visitors to the high lakes we observed. But that is not to say that fishing is unimportant in these areas. Fishing at high lakes provides a unique experience derived from the natural setting and the related wilderness activities. The backcountry or wilderness is a place where people can indulge in the notion that one can live off the land. Catching a few fish and eating them in camp with family or friends contributes to the quality of many visitors' experience--and is a goal of many others.

The challenge to resource managers is to recognize the importance and meaning of fishing and catching the fish in relation to the total high-lake recreation experience--to balance the demands for maximum fish production against the esthetic aspects of backcountry and wilderness experiences (Hendee and Schoenfeld 1977). Comprehensive management of the fishing and related high-lake resources is called for and will require close cooperation between fishery and other land use managers and planners (fig. 7).

Figure 7.--Fishing at high lakes provides a unique experience when people may indulge the notion that one can live off the land.

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METRIC CONVERSIONS

1 inch = 2.54 centimeters
1 mile = 1.609 kilometers
1 acre = 0.405 hectare
32°F = 0°C

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